

Rocky Intertidal Monitoring Protocol for the Redwood National and State Parks, CA

Standard Operating Procedure (SOP) # 14: Data Entry and Management including Uploading to MARINe Database

Version 1.00 (March 2008)

Revision History Log:

Previous Version	Revision Date	Author	Changes Made	Reason for Change	New Version
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This Standard Operating Procedure (SOP) provides an overview of data management procedures, including entering biological data into the Multi-Agency Rocky Intertidal Network (MARINe) database and data certification. This SOP also includes instructions on how and when to upload data to the MARINe database. The MARINe database was prepared by Bruce Bealer and Larry Cooper at Southern California Coastal Water Research Project (Bealer and Cooper 2003). The database instructions manual is included in full as supplementary material (Appendix C).

I. MARINe Database Overview

The MARINe Data Management System (MDMS) provides a uniform data acquisition, data analysis, and information storage and retrieval system for the Multi-Agency Rocky Intertidal Network. Members of MARINe, including RNSP, survey intertidal sites twice a year, once in spring/summer and again in fall/winter, during the daylight low tides. Each monitoring group records information about the species in the intertidal environment. Bi-annual sampling provides the basic design for the MARINe Data Management System.

Database Design

The MARINe database is an event driven database, designed for the semi-annual MARINe surveys. Data collected during the surveys are recorded in one of three “results” tables. The correct results table to use is based on the method of observation used in obtaining the results. These sets of results are recorded for each site in the MARINe system.

Basic Structure

Each site is a geographical location defined by its longitude and latitude. Within each site, collected data are categorized by one of three method types: photoplots, transects, or count and size. Within each method, plots or transects are grouped by target species. There can be one or more plots associated with a target species. It is this combination of site, plot type, target species, and individual plot ID which provides the uniqueness of each species recorded.

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The site-specific data are combined with seasonal environmental sampling event data to provide a unique survey result record. The environmental event data must be entered prior to recording seasonal data.

II. Using the Database

It is the responsibility of the Project Lead to enter all data into the MARINe database. Each season, a new version of the database will be downloaded from the MARINe internal web site and stored on the Project Lead's main computer. A backup will be stored on the University of California at Santa Cruz's computer network in a restricted folder. Copies of the database should not exist on multiple computers. It is highly recommended to directly work in the MARINe database only when doing seasonal maintenance or adding survey results. All analysis and investigation should be through another Access database and linked tables. The simple activity of adding a new table could cause automated functions to fail. Refer to the complete MARINe database user's manual before attempting to enter or manipulate data (Appendix C).

The following are general guidelines to keep in mind:

1. Data entry should occur as soon after data collection as possible, so that field crews keep current with data entry tasks and catch any errors or problems as close to the time of data collection as possible.
2. The working database will first be copied onto one workstation hard drive. All entry for a given field season will occur into this copy, preferably by a single user.
3. Each data entry form is patterned after the layout of the field form and has built-in quality assurance components such as drop down lists and validation rules to test for missing data or illogical combinations.
4. As data are being entered, the person entering the data should visually review each data form to make sure that the data on screen match the field forms. This should be done for each record, prior to moving to the next form for data entry.
5. Backing up the entered data should occur frequently with caution made to name the backed up database something that will not be confused with the working database copy.
6. When an entire season of data has been entered and checked for errors, the data are submitted to the main MARINe database.

Starting a New Season

Data for a season must be added in a specific sequence because most information depends upon supporting data having been previously entered. The basic sequence for entering data for a new season is to enter maintenance data, then event data, and finally results data. The items below indicate which activities to perform and their sequence.

Main Menu

The Main Menu (Figure 1) is the first screen presented after the application is launched. This menu provides access to all the database functions.

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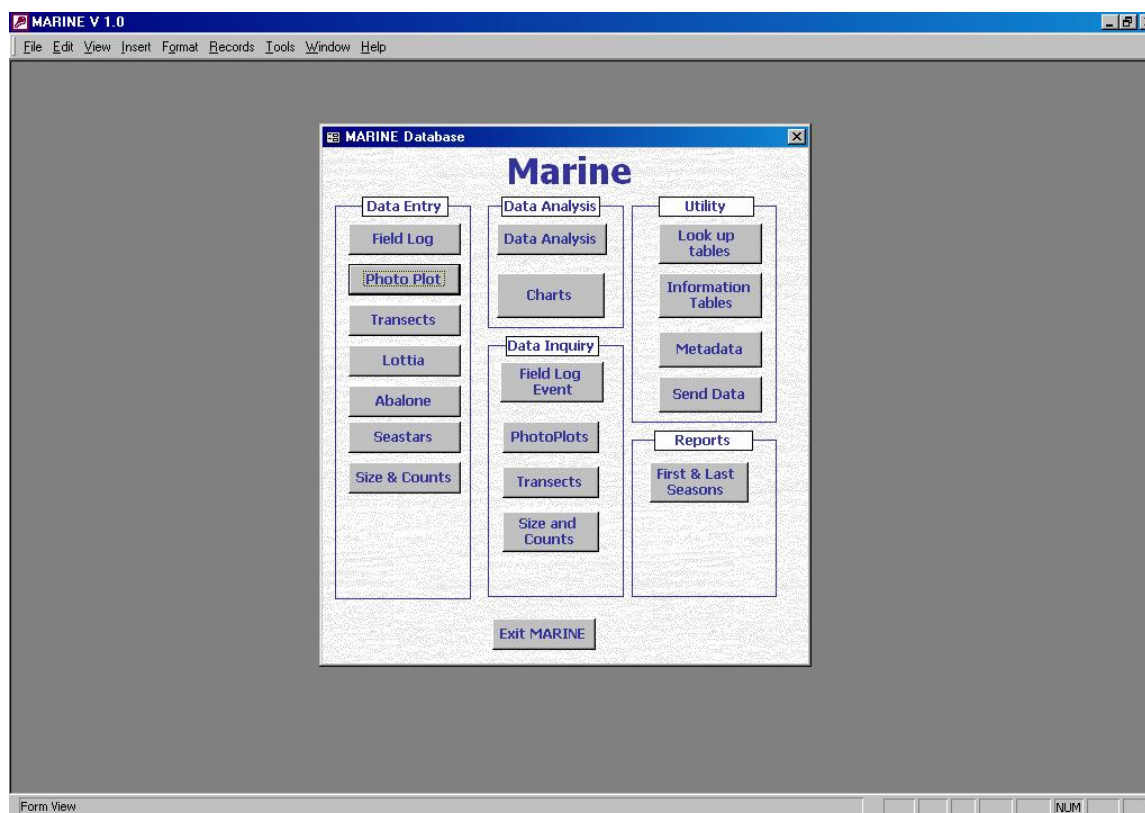


Figure 1. MARINe database main menu.

Data Entry Sequence

Tables must be loaded in a specific sequence because data in one table are dependent on data in a related table. Tables should be loaded in the following order (Appendix C has detailed instruction):

1. **Maintenance data:** Enter any changes or additions to maintenance tables first. Maintenance data are recorded in lookup tables. Lookup table names start with luListXX_LookupName. The season and personnel tables are examples of maintenance tables. *Add new seasons and personnel before entering any results data.*
2. **Information tables:** These tables contain data specific to MARINe that is not the result of seasonal surveying activity; therefore, they will rarely need to be updated. The site table is an example of an information table.
3. **Results table:** These tables record the actual results data of a field site survey. The field log event table is an example of a results table. It must be populated before the other results tables.

Survey Data Entry

These results tables record the survey data of the intertidal field monitoring. The following is a list of the results tables with a brief description of each. Refer to the MARINe User's Manual (Appendix C) for complete data entry instruction.

1. **Field Log Event Data Entry Form:** The Field Log Event Data Entry form is actually two forms: the Field Log form (Figure 2) and Site-wide Species Conditions form (Figure 3). For field methods, refer to SOP #4: Completing Field Logs and Assessing Site-wide Species Conditions. When you complete the Field Log form, click the "Continue" button and the Site-

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wide Conditions form will open. Both pages of the form must be completed at the same time. These forms must be loaded before the other results tables. The survey dates entered here appear in drop down boxes on the other forms.

The screenshot shows the MARINE Alpha 3.0 Current software interface. The main window is titled "MARINE Field Log" and contains a form for data entry. The form is divided into several sections:

- Header:** "MARINE Rocky Intertidal Field Log" with a note "(Fill in all blanks: ND=No Data; 0=None; L=Low; M=Med; H=High; or Actual Value)".
- Group Information:** Includes fields for Group (set to "SCWRP"), Season, Site, Date, Start Time, and End Time.
- Low Tide:** Fields for (ft) and (hr).
- Participants:** A dropdown menu for "Other Participants" and a field for "Recorder".
- Weather and Sea Conditions:** Includes dropdowns for Surge, Wind, Rain, Recent Rain, and Water Temperature (°C).
- Substratum Changes:** Includes dropdowns for Sediment Level, Scour, and Rock Movement.
- Debris and Pollutants:** Includes dropdowns for Plant Wrack, Driftwood, Shell Debris, Dead Animals, Trash, and Oil/Tar.
- Notes on Physical Conditions:** A large text area for notes.
- Birds and Mammals:** Two tables for recording species and counts. The Birds table has a dropdown for Species and a count field set to 0. The Mammals table has a dropdown for Mammal and a count field set to 0.
- Bird and Mammal Notes:** A text area for additional notes.
- Humans:** Fields for "Reef" and "Sand" counts.
- Plot Marker Loss/Repair Notes:** A text area for notes.
- Other Notes:** A text area for additional notes.
- Buttons:** "Return" and "Continue" buttons.
- Footer:** A record navigation bar showing "Record: 1 of 1" and a "Select a surveying group" dropdown.

Figure 2. MARINE Rocky Intertidal Field Log form

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MARINE File Edit View Insert Format Records Tools Window Help

frmRecon Rocky Intertidal Monitoring Site-Wide Species Conditions

Group: Site: Date:

Species	Abundance	Appearance			Recruitment	Notes
Intertidal Zone	ND=No Data D=Absent R=Rare U=Uncommon P=Present C=Common A=Abundant	ND=No Data OK=Healthy L=Low level M=Med level H=High level			ND=No Data D=Absent L=Low level M=Med level H=High level	
Target Species in bold		Fertile/Flowers	Bleached	Damaged		
Cladophora columbiana						
Ulva/Enteromorpha						
Egregia menziesii						
Eisenia arborea						
Endarachne/Petalonia						
Fucus gardneri						
Halidrys dioica/Cystoseira spp.						
Hesperophycus californicus						
Pelvetiopsis limitata						
Postelsia palmaeformis						
Sargassum muticum						
Scytosiphon spp.						
Silvetia compressa						
Endocladia muricata						
Chondracanthus canaliculatus						
Mastocarpus papillatus						
Mazzaella affinis						
Mazzaella spp. (= Iridaea spp.)						

Scroll Down for more species
Add Additional Species at bottom

Record: of 1

Form View NUM

Figure 3. MARINE Rocky Intertidal Site-Wide Species Conditions form.

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2. **Photoplot Data Entry Form:** This screen (Figure 4) is for entering summarized photoplot data (SOPs #5-7) (i.e., data that have been converted to percent cover for selected target species plots). The photoplot data entry form is designed to enter results one plot at a time.

MARINE - [Photo Plots Data]

File Edit View Insert Format Records Tools Window Help

MARINE Photoplot Data Entry

Basic Information

Group: SCCWPR Season: SP03 Site ID: Test: Survey Date: 12-Jun-03 Target Species: Barn Quad: 1

Core Species

CLACOL	ULVENT	OTHGRE	EGRMEN	EISARB	ENDPET	FUCGAR	HALCYS	HESCAL	PELLIM	SARMUT	SCYSPP
Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0

SILCOM	OTHBRO	ENDMUR	CHOCAN	MAAPAP	MAZAFF	MAZSPP	PORSPP	ARTCOR	CRUCOR	OTHRED	PHYSCT
Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0

NONCRU	OTHPLA	ANTELE	PHRCAL	MYTCAG	LOTGIG	LIMPET	CHITON	CHTBAL	TETRUB	POLPOL	OTHBAR
Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0

PISOCH	OTHINY	ROCK	SAND	TAR	UNIDEN
Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0

Scoring Method: Lab Comments: Larry C

Optional Species

ABCDEF	GHIJKL	MNOPQR
Qualifier Result: 0	Qualifier Result: 0	Qualifier Result: 0

Not Sampled Return Save Total % Cover: 0

Form View NUM

Figure 4. Photoplot data entry form.

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3. **Transects Data Entry Form:** This screen (Figure 5) is for entering summarized transect data (SOP #10: Surfgrass Monitoring). That is, data that have been converted to percent encountered for selected target species transects, namely surfgrasses (*Phyllospadix scouleri/torreyi*).

The screenshot shows a software window titled "MARINE - [Transects Data entry]". The window has a menu bar with "File", "Edit", "View", "Insert", "Format", "Records", "Tools", "Window", and "Help".

Basic Information

Group: SCCWRP Season: [dropdown] Site ID: [dropdown] Survey Date: [dropdown] Target Species: [dropdown] Transect: [dropdown]

Core Species

PHYOVE	PHYUND	EGRMEN	EISARB	HALCYS	SARMUT	CRUCOR	NONCRU	ARTCOR	OTHRED	OTHBRO	OTHGRE
Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]

OTHPLA	ANTELE	PHRCAL	MYTCAG	BARNAC	OTHINV	ROCK	SAND	TAR	UNIDEN	PHYTOT
Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]	Qualifier Result: [dropdown]

Comments: [text area]

Total Phyllo % Cover: 0

Scorer: [dropdown] Method: Transect 10 Meter [dropdown]

Optional Species

ABCDEF	GHIJKL
Qualifier Result: [dropdown]	Qualifier Result: [dropdown]

[text area]

Buttons: Not Sampled, Return, Save

Total % Cover: 0

Form View [NUM]

Figure 5. Transects data entry form.

SOP #14: Data Entry and Management including Uploading to MARINE Database (continued).

4. **Sea Stars Data Entry Form:** This form (Figure 6) is for entering summarized size and count information that has been totaled for each size class of ochre sea star (*Pisaster ochraceus*) (SOP #9: Sea Star Monitoring).

Figure 6. Sea stars data entry form.

III. Sending Data to SCCWRP

The main MARINE database is maintained by the Southern California Coastal Water Research Project (SCCWRP). After each field season's data are entered into a copy of the database and thoroughly checked for any obvious mistakes, this copy is sent to SCCWRP to be included in the updated version of the main database. The Project Lead will be responsible for all database tasks, including entering, checking, and sending off data.

The Send Data button is used to select data that have not been sent to SCCWRP, create an Access database to store it in, and, if an email system is available, send an email to SCCWRP with the database as an attachment. If an email system cannot be found, the user must attach the Access database to an email and send it to SCCWRP at larryc@sccwrp.org.

Database Update Schedule

Fall survey data (typically October-January) should be submitted to the main MARINE database at SCCWRP no later than **March 1** of the following year. Summer survey data (typically May-August) should be submitted no later than **November 1** of the current year. This allows roughly three months

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for scoring slides and completing the data entry templates. Updated versions of the database will be released twice a year: by **April 1** and **August 1**. Table 1 summarizes this schedule.

Table 1. Summary of submission and release dates for the MARINe database, by survey season.

Survey Season	Data Submission Deadline	Database Update Released
Fall	March 1	April 1 or August 1
Summer	November 1	April 1 or August 1

IV. Completing Data Certification

To ensure that only quality data are included in reports and other project deliverables, the data certification step is an annual requirement for all deliverables except reports. The Project Lead is primarily responsible for completing the Klamath Network Data Certification form (Attachment A), which tracks the submission of project products to the Network. Forms can also be obtained by contacting the Network Data Manager or by going to the Klamath Network website. The Certification form should be submitted, along with all project products, prior to the start of a new field season. A new Certification form should be submitted each time a product is submitted. If multiple products are submitted at the same time, only one Certification form is needed for those products.

The Project Manager will submit a Data Certification form (Mohren 2007) to the Klamath Network to ensure:

1. The data are complete for the period of time indicated on the form.
2. The data have undergone the quality assurance checks indicated in the vital sign monitoring protocol.
3. Metadata for all datasets has been provided.
4. Project timelines are being followed and all products from the field season have been submitted.

Data Certification Form

A description of each field on the certification form is included below.

- 1) Certification date – The date the form was submitted to the Klamath Network.
- 2) Certified by – The name of the person certifying the products.
 - a. Title – Position of the person certifying the products.
 - b. Affiliation – Agency / Organization / University.
- 3) Project code – Each project will be given a code by the Klamath Network.
 - a. Project title – Each project will be given an official title by the Klamath Network.
- 4) Ranges of dates for certified data – Include the month and year of the data collected for the products you are submitting.
- 5) Description of the data being certified – Give a brief description of each product that is being submitted.
- 6) Parks and details – List any parks that are represented by the products being submitted. Provide any details that might be necessary to understand the relationship between the products being submitted and the park represented.

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- 7) Certification product and name – Put a checkmark next to each type of product you are submitting. Indicate the name of the file(s) next to the product. If the product is an image, indicate the name of the folder used to store the images.
- 8) Sensitive information – Indicate if the product can be released to the public. This does not mean the Klamath Network will release the product, but this information is necessary in case we have to, or chose to, release the product (e.g., FOIA request).
- 9) Data processing and quality assurance procedures – Describe what QA/QC steps were involved to ensure the accuracy and quality of the data. You only need to describe processes outlined in the protocol that were NOT followed, or processes that were not outlined in the protocol but were used for these products.
- 10) Who reviewed the product – Describe who reviewed the product for content, sensitivity, and quality. At a minimum, the Project Manager should be included in this step.
- 11) Results of the QA – Describe what steps were involved to resolve any issues that came up during the quality assurance reviews.

Literature Cited

Bealer, B., and L. Cooper. 2003. MARINe database user guide. Version 3.1. SouthernCalifornia Coastal Water Research Project, Westminster, CA.

Mohren, S. 2007. Data certification guidelines. National Park Service, Klamath Network, Ashland, OR.

Attachment A. KLMN Certification Form.

- 1) Certification date: _____
- 2) Certified by: _____
Title: _____
Affiliation: _____
- 3) Project code: _____
Project title: _____
- 4) Range of dates for certified data: _____
- 5) Description of data being certified: _____
- 6) List the parks covered in the certified data set, and provide any park-specific details about this certification.

Park	Details

- 7) This certification refers to data in accompanying files. Check all that apply, and indicate file names (folder name for images) to the right:

_____ Hardcopy Datasheet(s): _____

_____ PDF Datasheet(s): _____

_____ Database(s): _____

_____ Spreadsheet(s): _____

_____ Spatial data theme(s): _____

_____ GPS file(s): _____

_____ Geodatabase file(s): _____

_____ Photograph(s): _____

_____ Data Logger(s) files: _____

_____ Other (specify): _____

Certified data are already in the master version of a park, KLMN or NPS database. Please indicate the database system(s): _____

- 8) Is there any sensitive information in the certified data which may put resources at greater risk if released to the public (e.g., spotted owl nest sites, cave locations, rare plant locations)?

_____ No _____ Yes Details: _____

- 9) Was all data processing and quality assurance measures outlined in the protocol followed? Yes / No
If No, Explain _____

- 10) Who reviewed the products? _____

- 11) Results and summary of quality assurance reviews, including details on steps taken to rectify problems encountered during data processing and quality reviews.